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10/578,194

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EXAMINER

YANCHUK, STEPHEN J

ART UNIT

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1795

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

| | | | |
|------------------------------|--------------------------------------|--------------------------------------|--|
| Office Action Summary | Application No. 10/578,194 | Applicant(s) KIMURA ET AL. | |
| | Examiner STEPHEN YANCHUK | Art Unit 1795 | |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 25 February 2009.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-17 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☐ Claim(s) _____ is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

FUEL CELL AND METHOD FOR FABRICATING SAME

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1, 2, 7-10 are rejected under 35 U.S.C. 102(b) as being anticipated by Choichi et al. (JP-05041221).

Claims 1, 2, 9, and 10 are rejected by Choichi teaching two or more fuel cells are connected in series through a solid polymer electrolyte membrane (PEM) (14) [Paragraph 12]. The fuel cell consists of two electrode sheets (15, 16), one on opposite side from the other electrode sheet [Paragraph 04]. The current collector passes through the MEA (12) [Paragraph 14]. Both electrodes are surrounded by resin (19) [Paragraph 17] (Instant claim 1 and 2). The current collector is shown to be embedded in the resin section and connects the first and second electrode in figure 1 (Instant claim 9). Figure 1 further shows that the current collector is not a current collecting plate (Instant claim 10).

Claim 7 is rejected by the teaching of one side of the MEA having disposing electrodes, one air (oxygen electrode) and one fuel [Paragraph 14].

Claim 8 is rejected by figure 1 showing the MEA and electrodes surrounded on the ends by resin material.

Claim 11 is rejected by the teaching of the structure in the rejection of claim 1 and the teaching that the structure was constructed by hot press (thermal pressing) [Paragraph 4].

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 3-6, 12, 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Choichi et al. (JP-05041221) as applied to claims 1 and 11 above, and further in view of Kinkelaar et al (PGPUB 2004/0191605).

Claims 3-6 are rejected by Choichi teaching the claim limitation set forth in claim 1 and a porous gas diffusion layer [Paragraph 16]. The GDL is also taught to include hydrophobic carbon black and platinum catalyst particles (a hydrogen-ion conducting catalyst) [Paragraph 19]. Choichi fails to clearly identify the materials involved in the fabrication of the gas diffusion layer (GDL).

Kinkelaar teaches a GDL containing a conductive polymer and metal [Paragraph 27]. The GDL is taught to include contact with catalysts (instant claim 3 and 5) as well as hydrophobic treatments (Instant claim 6) [Paragraph 58]. A pure foamed metal gas

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diffusion layer is taught to be known in the art and the polymer and metal GDL is a replacement [Paragraph 13]. It would have been obvious to one of ordinary skill in the art at the time of the invention to use the GDL of Kinkelaar in place of the GDL of Choichi because Kinkelaar teaches that it is a better GDL than the previously known foamed metal and can be treated the same way as Choichi.

Claim 12 is rejected by the GDL of Kinkelaar with the fuel cell of Choichi if the claim implies the structure of GDL's on the outer sides of the electrodes which sandwich the MEA wherein the GDL's are porous metals.

Claim 14 is rejected by the teaching of a porous material taught in Kinkelaar that can be used as an electrode [Paragraph 57]. This porous material can have catalyst support thereon [Paragraph 58].

5. Claims 11-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Maeda (PGPUB 2004/0086762) and further in view of Choichi et al. (JP 05041221) and Kinkelaar et al (PGPUB 2004/0191605).

Maeda teaches a plurality of unit cells arranged in a flat manner wherein the first electrode (11) and second electrode (12) sandwich a MEA layer (13) [Figure 5; Col 6 Ln 43]. The stack is known as a polymer electrolyte fuel cell (PEFC) and can have a separator plate [Col 2 Ln 23]. This separator can be obtained by kneading carbon into a resin [Col 2 Ln 33]. The separator is formed by electro deposition, which will surround and support the electrodes [Col 4 Ln 31]. This electro deposited separator will need to

be heated in order to polymerize [Col 4 Ln 37]. Maeda fails to teach thermally pressing the electrode sheets as the method for creating the PEFC with separator.

Choichi teaches two or more fuel cells are connected in series through a solid polymer electrolyte membrane (PEM) (14) [Paragraph 12]. The fuel cell consists of two electrode sheets (15, 16), one on opposite side from the other electrode sheet [Paragraph 4]. The current collector passes through the MEA (12) [Paragraph 14]. Both electrodes are surrounded by resin (19) [Paragraph 17]. The current collector is shown to be embedded in the resin section and connects the first and second electrode in figure 1. The structure was constructed by hot press (thermal pressing) [Paragraph 4]. It would have been obvious to use hot pressing in Maeda because Choichi because they have the same structural elements and Choichi teaches that hot pressing is a preferred method of joining the stack.

Claim 12 is rejected by Maeda teaching above and the teaching that the support plates should be porous layers attached to the collecting members (electrodes) [Col 1 Ln 63]. It is also taught the material of these electrodes can be metal [Col 2 Ln 35].

Claim 13 is rejected by Maeda teaching a method of forcing an electroconductive rivet through the MEA layers of plural fuel cell stacks as shown in figure 5. Figure 5 clearly depicts the top of the rivet enlarging, but does not show the bottom enlarging. It would appear that the bottom would enlarge as a reaction to the force of driving since the resin material will not provide much resistance to the rivet compared to the two electroconductive ends.

Claim 14 is rejected by Maeda and the teaching that the electrodes can have catalyst layer thereon [Col 1 Ln 59]. Maeda fails to teach a porous electrode.

Kinkelaar teaches that an electrode can be made by a porous material [Paragraph 57]. This porous material can have catalyst support thereon [Paragraph 58]. It would have been obvious to use the electrode in the stack of Maeda as suggested by Kinkelaar because the porosity in the electrode will allow the fuel/gas to be exposed to more surface area and therefore have less un-reacted material.

Claim 15 is rejected by Maeda teaching an electrode that is exposed on its far side from the MEA and resin section.

Claim 16-17 is rejected by Figure 5 of Maeda wherein "penetrating" is a method limitation and not a positively recited product limitation. Figure 5 depicts a connecting member that passes through the plane of the plurality of electrodes.

Response to Arguments

Applicant's arguments filed 02/25/2009 have been fully considered but they are not persuasive. The drawings made by the applicant to interpret the prior art are not accurate. The joining piece is taught to join two ends or more of cell units "through" a solid polymer electrolyte membrane one by one. [Paragraph 13]. One of ordinary skill would have known, and had the ability to have the electro conductive member penetrate the solid electrolyte membrane at the time of this prior art.

In response to applicant's argument that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies

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(i.e., singular membrane layer) are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993). The claim is to a plurality of first electrodes being on one plane which is taught by the prior art. The claim does not indicate the solid electrolyte membrane being one or many sheets. The second electrodes follow the same interpretation map as the first and therefore do not require only one sheet of membrane.

Claim 1 defines the product by how the product was made. Thus, claim 1 is a product-by-process claim. For purposes of examination, product-by-process claims are not limited to the manipulation of the recited steps, only the structure implied by the steps. See MPEP 2113. In the present case, the recited steps imply a structure where in the membrane layer is in a plane that has a connector crossing that plane wherein the membrane can not occupy the same crossover point so it is voided from this area. "Penetrated" is also a product by process limitation term wherein the product only has to have the electro-conductive member in the plane where the membrane would be. The reference suggests such a product.

The examiner holds that the representation of Choichi submitted by the applicant is invalid and not an accurate. The rejection to claim 1 and 11 are valid since there are no further arguments submitted by the applicant and this action is made final.

Conclusion

1. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to STEPHEN YANCHUK whose telephone number is (571)270-7343. The examiner can normally be reached on Monday through Thursday 8:30am to 5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick Ryan can be reached on 571-272-1292. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/STEPHEN YANCHUK/
Examiner, Art Unit 1795

/PATRICK RYAN/
Supervisory Patent Examiner, Art Unit 1795